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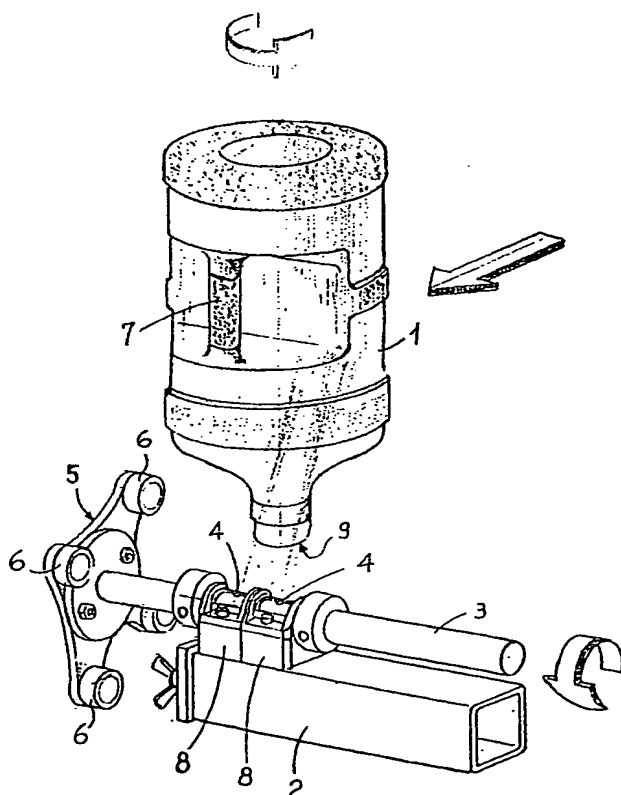
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[Continued on next page]

(54) Title: **AN APPARATUS FOR WASHING THE INTERIOR OF CONTAINERS MADE OF PLASTIC MATERIAL**



(57) Abstract: An apparatus for washing containers (1) made of plastic material with capacity ranging between 5 and 30 litres which may be provided with a handle (7) to facilitate its handling, comprises: - means for gripping the container (1) in upside down condition, i.e. with the mouth (9) oriented downwards, so shaped as to allow also a rotation of the container (1) about its own central longitudinal axis; - spraying means (4) for spraying suitable cleaning fluid inside the container (1) whilst said container rotates about its own central longitudinal axis, and is characterized in that the spraying means comprise at least a pair of movable nozzles (4), so shaped as to produce at least a pair of rotating jets of cleaning fluid which simultaneously penetrate inside the container (1) through the mouth (9) to clean the interior of the container (1) and of the grip (7) if present.

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AN APPARATUS FOR WASHING THE INTERIOR OF CONTAINERS MADE OF
PLASTIC MATERIAL

TECHNICAL FIELD AND BACKGROUND ART.

5 The present invention relates to an apparatus for washing the interior of containers made of plastic material.

In particular the present invention pertains to the sector of linear washer machines used for instance for cleaning reusable containers such as large sized tanks, i.e. large bottles, containing about 11, 19 or 23 litres (i.e. 3, 5, 6 gallons), generally applied on water
10 dispensing apparatuses.

The Italian patent application for industrial invention no. PR2000A000006 in the name of the same Applicant discloses a machine for washing containers comprising a base structure, means for housing the containers positioned with their mouth oriented downwards, a plurality of brushes mounted able to rotate on the base structure to clean
15 the outer surface of the containers. In this machine the means for housing the containers comprise gripping organs able to move between an open position and a closed position and provided with sliding elements, interposed between the gripping organs and the neck of the container and constituted by idle rollers, to allow the rotation of the container by means of the rotating action of the brushes.

20 Cleaning the interior of the container is particularly difficult, especially if the container is provided with a grip handle, which must be cleaned internally together with the container.

In PR2000A000006, the base structure of the washer machine has a plurality of nozzles which generate a jet able to move according to an arching trajectory, which penetrates
25 inside the containers to wash the internal surfaces and which partially cleans the external

surface in proximity to the neck. However, although numerous nozzles are present, each container is cleaned by means of a single jet of cleaning fluid emitted by a single nozzle. This is also confirmed by the description of the aforesaid document which repeatedly states "...the internal washing operation takes place when the mouth of the container lies above a nozzle" and "...the nozzle follows the container."

According to some possible embodiments, the nozzles can be fixed or movable relative to the base structure.

In the first case, the motion of the containers along the base structure is intermitted and the interior is washed when the mouth of the containers lies above a nozzle.

In the second case, the motion of the containers and the washing of their interior is continuous because the nozzle follows the container.

The presence of a single nozzle, fixed or movable, is not always sufficient for an adequate cleaning of the interior of the container, above all if the handle is present.

DISCLOSURE OF THE INVENTION.

The aim of the present invention is to eliminate the aforesaid drawbacks and to make available a simple and economical washing apparatus, which can provide for an adequate internal washing of the container and possibly also of the related handle.

Said aims are fully achieved by the washing apparatus of the present invention, which is characterised by the content of the claims set out below and in particular in that the spraying means comprise at least a pair of movable nozzles, so shaped as to produce at least a pair of oscillating jets of cleaning fluid that simultaneously penetrate inside the container through the mouth.

The spraying means preferably comprise a rigid conduit for feeding the cleaning liquid provided on its own surface with one or more series of nozzles; a star-shaped element keyed onto said conduit and provided with a plurality of idle rollers, in a number equal

to the number of nozzles of each series. Said star element is set in rotation by the actuation of the container in the washer machine.

BEST MODE FOR CARRYING OUT OF THE INVENTION.

This and other characteristics shall become more readily apparent from the following description of a preferred embodiment illustrated, purely by way of non limiting example,
5 in the accompanying drawing tables, in which:

- Figures 1 through 3 show the apparatus in three successive operative steps of the washing process.

10 With reference to the figures, the number 1 designates a container or large bottle destined to be introduced in a washer machine, preferably of the linear type.

The container 1 is generally of the reusable type such as water tanks having a capacity ranging between 5 and 30 litres, used in dispensing devices and destined to undergo a cleaning operation both of their interior and of their exterior walls.

15 For the description of the washer machine and of the means for gripping and handling the container 1, reference is made to the content of the aforementioned patent application PR2000A000006, since substantially the same means are used, which for the sake of greater clarity are not shown in the figures (such as the gripping means, the brushes, the rollers and the support structure), where instead only the washer apparatus and the bare container are shown.

20 The reference number 2 indicates a fixed frame whereto is anchored, free to rotate on itself, a rigid conduit 3 for feeding a cleaning fluid.

The conduit 3 has on its lateral surface two series of four nozzles 4 each, arranged at 90° from each other on the circumference of the conduit.

To the conduit 3 is made integral a star-shaped element 5 provided with four idle rollers

There can also be more than two series of nozzles and each series can comprise a different number of nozzles, however the number of nozzles 4 of each series is equal to the number of idle rollers 6 present on the star-shaped element 5.

5 The container 1 is provided in the illustrated case with a handle 7, but the invention also applies to containers 1 without a handle.

The operation of the apparatus is as follows. When the container 1, supported in known fashion by gripping means associated with a support structure or movable bar, it approaches the washing apparatus rotating about its own longitudinal axis, the support structure or movable bar impacts against one of the idle rollers 6 producing the rotation
10 of the star-shaped element of about 90° and hence the consequent counter-clockwise rotation of the conduit 3 in such a way that the pair of "free" nozzles 4 (i.e. not belonging to the area of the conduit that is laterally sealed by protection elements 8) can emit jets of fluids which simultaneously penetrate inside the container 1 through the mouth 9 describing a circular sector.

15 The nozzles 4 constitute means for spraying fluid inside the container and are destined to effect a complete interior cleaning of the container as well as an exterior cleaning action in the area of the mouth 9.

In particular, in a terminal phase of the rotating movement (illustrated in Figure 3) or in an initial phase (in an embodiment not illustrated herein which provides for the clockwise
20 movement of the conduit 3) the two jets clean the internal lateral surface of the container and the internal cleaning of the handle 7, whilst the intermediate phase is oriented for the cleaning of the bottom of the container.

Actually, the orientation of the container is unknown, in the sense that the position of the handle is not known. For this reason, during the action of the jets the container is set in
25 rotation on itself by the brushes (see patent application PR2000A000006) in such a way

that the jets are able to impact also on the area of the handle, wherever it is located at the time of the start of the washing cycle.

The rotation of the container causes the whole internal surface of the container to be accurately cleaned by the two jets.

5 The simultaneous presence in the container of at least two distinct jets coming from respective distinct nozzles, allows a better cleaning operation than what was possible with the prior art that provided for a single jet.

CLAIMS

1. An apparatus for washing the interior of containers (1) made of plastic material with a capacity ranging between 5 and 30 litres, which may be provided with a handle (7) to facilitate their handling, of the type comprising:

- means for gripping the container (1) in upside down condition, i.e. with a mouth (9) oriented downwards, so shaped as to allow also a rotation of the container (1) about its own central longitudinal axis;

- spraying means (4) for spraying suitable cleaning liquid inside the container (1) whilst said container (1) rotates about its own central longitudinal axis,

characterised in that the spraying means comprise at least a pair of movable nozzles (4), so shaped as to produce at least a pair of rotating jets of cleaning fluid which simultaneously penetrate inside the container (1) through the mouth (9) to clean the interior of the container (1) and of the handle (7), if present.

2. An apparatus as claimed in claim 1, wherein the spraying means comprise:

- a rigid conduit (3) for feeding the cleaning fluid provided on its own lateral surface of at least two series of nozzles (4);

- a star-shaped element (5) made integral with said conduit (3) and provided with a plurality of idle rollers (6), in a number equal to the number of nozzles (4) of each series, said star-shaped element (5) being set in rotation by the actuation of the container (1).

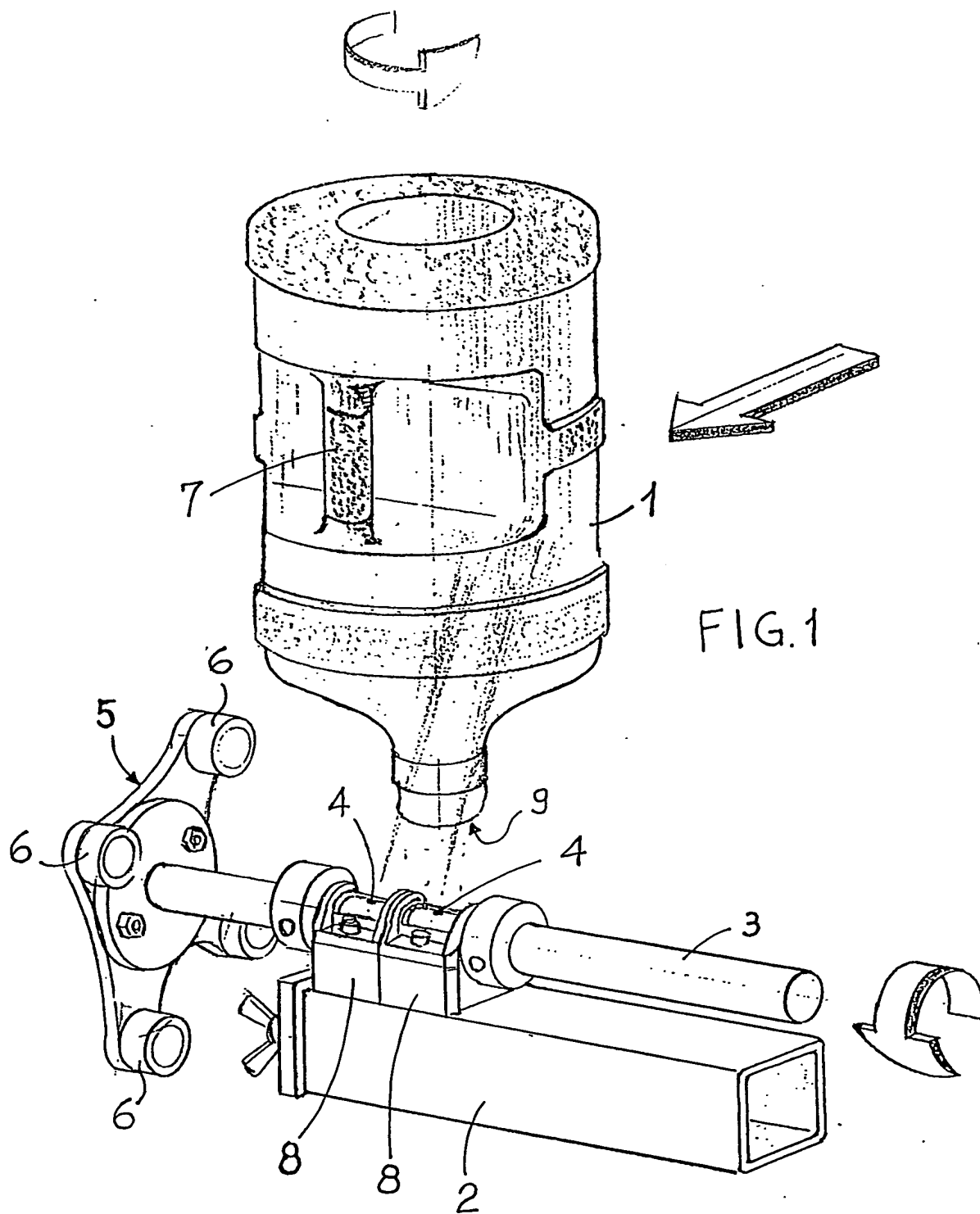
3. An apparatus as claimed in claim 2, wherein each series of nozzles (4) comprises four nozzles and the star-shaped element (5) comprises four idle rollers (6), in such a way that a washing cycle corresponds to a 90° rotation of the conduit (3).

4. An apparatus as claimed in claim 1, wherein the nozzles (4) are so shaped that in each initial or terminal phase of the rotary motion the two jets exiting the pair of nozzles internally clean the handle (7) of the container (1).

5. A machine for washing containers, characterised in that it comprises at least an apparatus as claimed in any of the previous claims.

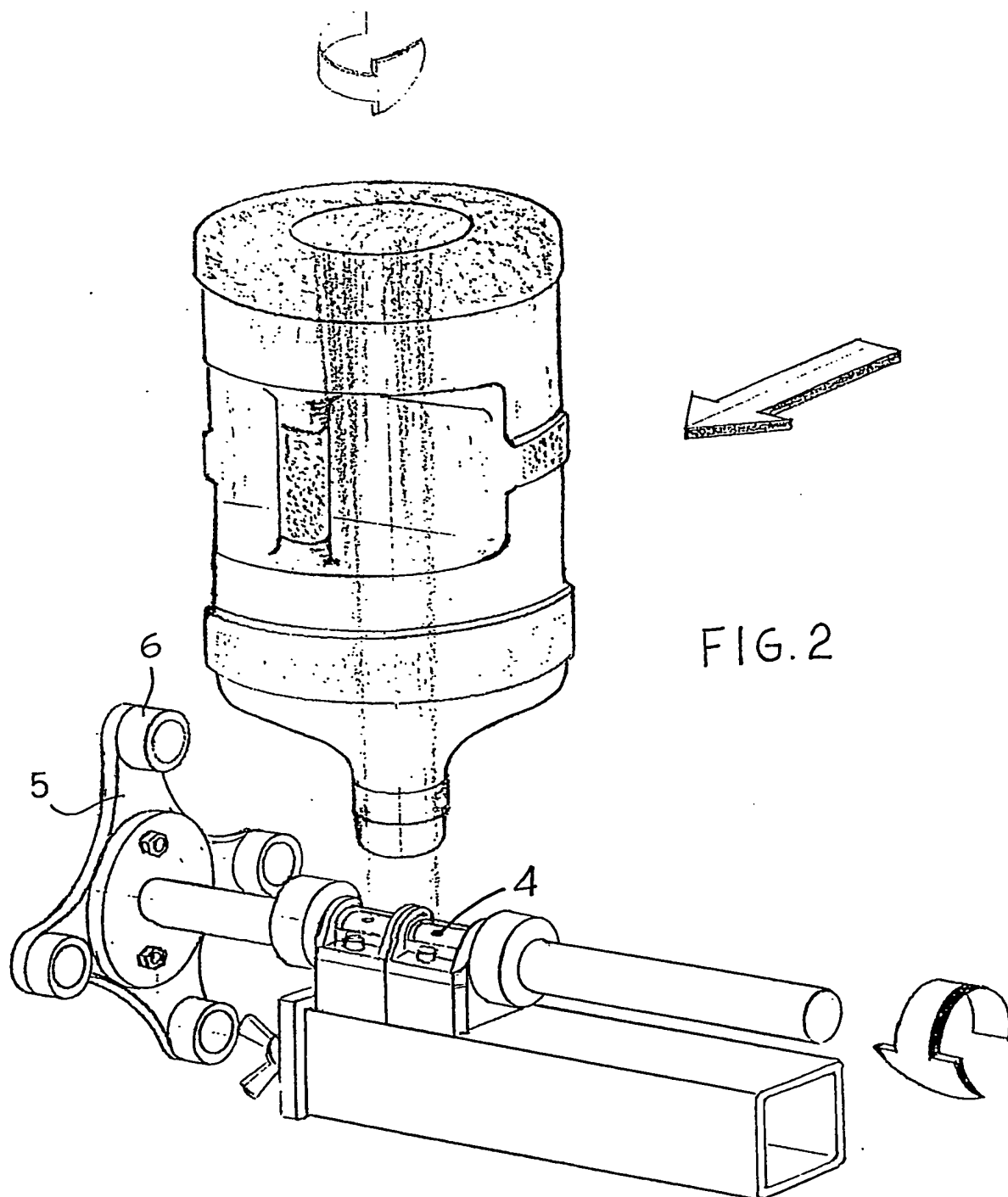
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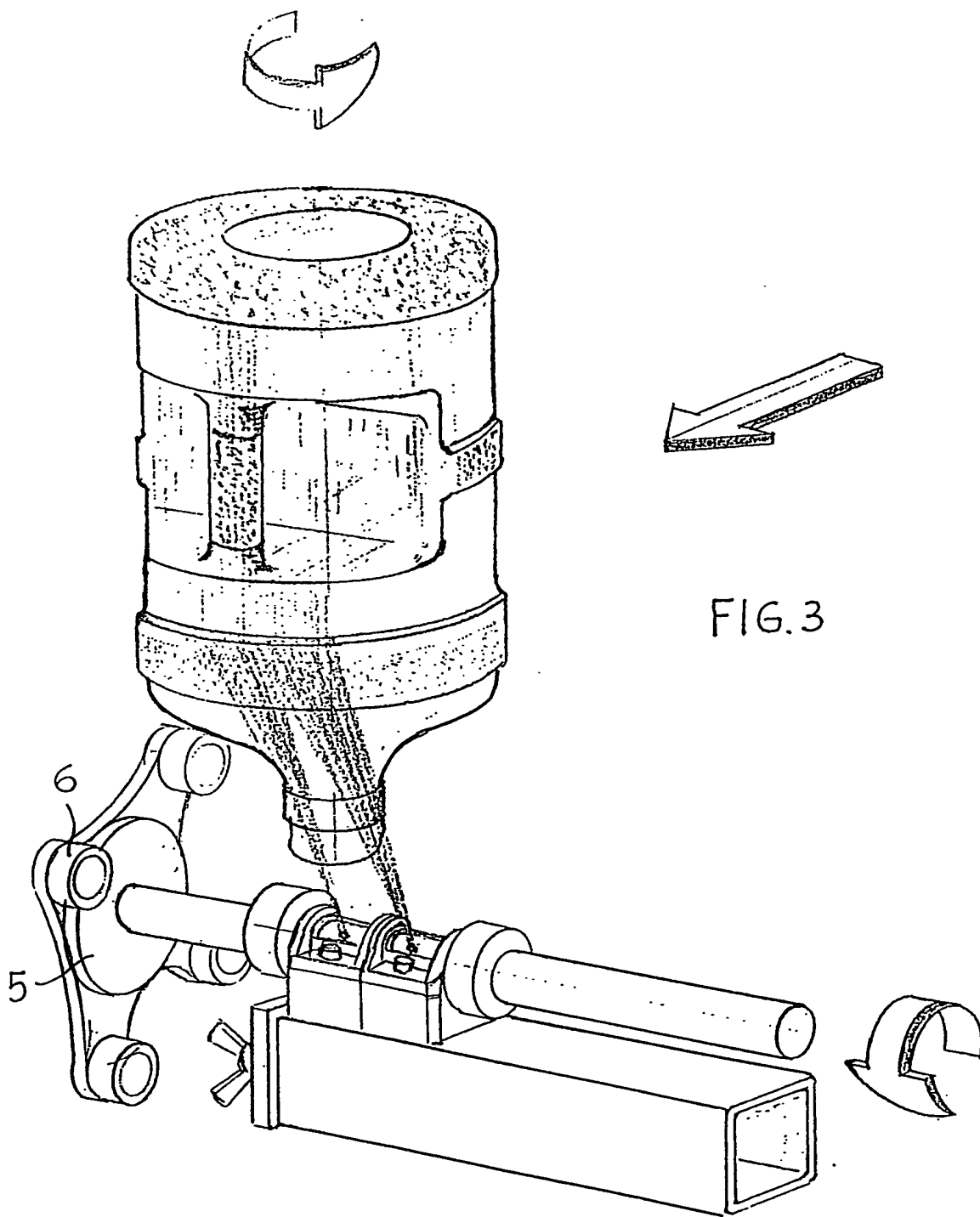
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C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	EP 0 411 377 A (ORTHMANN & HERBST) 6 February 1991 (1991-02-06) abstract; figures 10-12 column 4, line 43 -column 8, line 16	1-5
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